

Project: IH 635 LBJ Freeway, Section 4 - West
Phase II Geotechnical Investigation - Appendix B - Estimate of Laboratory Testing

Soil	Test	Phase I # Performed	Phase II Estimated Number	Unit Cost ⁽¹⁾	Total Cost		Remarks/rationale
	Natural Moisture Content	181	100				Soil classification, phase relationships
	Atterberg Limits	83	30				Soil classification
	Grain size analysis - sieve	6	10				Soil classification, permeability estimates
	Grain size analysis - hydrometer	1	10				Soil classification, permeability estimates
	Unconfined compressive strength	57	30				Soil strength
	E and Poisson's Ration for UCS		11				Soil elastic constants for numerical modeling ⁽²⁾
	Triaxial - UU	8	10				Soil strength/deformation
	Triaxial - CU	9	5				Soil strength/deformation
	Unit weight		10				Soil classification, phase relationships
	Consolidation		5				For input to potential settlement and
	One-dimensional swell		5				expansive soil issues assessment
	Soil pH		20				For input to cement type selection
	Soil Resistivity		20				and corrosion assessment
	Sulfate test on soils		20				Run one per boring west of Station 190+00 and five on
	Sulfate and chloride test on groundwater		5				selected soils overlying Austin Chalk
	Soil Test Subtotal						
Rock	Test						
	Natural Moisture Content	200 approx	100				Phase relationships, correlation to other geologic data
	Unit Weight	250 approx	125				Phase relationships, correlation to other geologic data
	Unconfined compressive strength	133	70				Rock compressive strength
	Triaxial - UU	15	10				Rock compressive strength
	Point load - axial/diametral	267	125				Rock compressive strength by correlation
	Brazilian tensile test	39	20				Rock tensile strength, cuttability estimation
	Slake durability	10	0				Estimation of slaking behavior during construction
	Simple slaking test(3)		10				Estimation of slaking behavior during construction
	Rock Test Subtotal						
Physical Property Tests for Mech. Excavation Estimation							
	Cerchar Abrasivity Index (CAI)	NA	10				5 tests each on argillaceous and non-arg facies
	Punch Penetration Test	NA	6				3 tests each on argillaceous and non-arg facies
	Thin-section petrographic analysis	NA	4				2 tests each on argillaceous and non-arg facies
	Schmidt Hammer	NA	10				5 tests each on argillaceous and non-arg facies
	Shore Sceleroscope	NA	10				Substitute Shore for Schmidt if necessary
	Taber Abrasion	NA	6				3 tests each on argillaceous and non-arg facies
	Mineralogy by X-ray diffraction		6				3 tests each on argillaceous and non-arg facies
	Roadheader performance prediction		1				By Earth Mechanics Institute
	Sample shipping to Golden, CO		1				Estimate only - quote should be provided
	Physical Properties Test Subtotal						
				GRAND TOTAL			

Notes

- (1) Costs based on Phase I prices for soil and rock - may need to be updated
Physical property tests based on Earth Mechanics Institute (Colorado School of Mines) price sheet
- (2) Perform 8 tests on Austin Formation - 4 in argillaceous facies and 4 in non-argillaceous facies
Perform 3 tests on Eagle Ford Shale
- (3) Procedure from U.S. Bureau of Reclamation Geology Manual provided in package